

**IN THE UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF NEW YORK**

STATE OF NEW YORK, et al.,

Plaintiffs,

v.

UNITED STATES DEPARTMENT  
OF COMMERCE, et al.,

Defendants.

18-CV-2921 (JMF)

**NOTICE OF FILING OF TRIAL AFFIDAVIT OF DR. CHRISTOPHER WARSHAW**

Plaintiffs hereby file with the Court the following trial affidavit:

1. Oct. 26, 2018 Declaration of Dr. Christopher Warshaw (Ex. 1).

Respectfully submitted,

By: /s/ Dale Ho

Dale Ho  
American Civil Liberties Union Foundation  
125 Broad St.  
New York, NY 10004  
(212) 549-2693  
dho@aclu.org

Andrew Bauer  
Arnold & Porter Kaye Scholer LLP  
250 West 55th Street  
New York, NY 10019-9710  
(212) 836-7669  
Andrew.Bauer@arnoldporter.com

Sarah Brannon\*  
American Civil Liberties Union Foundation  
915 15th Street, NW  
Washington, DC 20005-2313  
202-675-2337  
sbrannon@aclu.org

John A. Freedman  
Arnold & Porter Kaye Scholer LLP  
601 Massachusetts Avenue, N.W.  
Washington, DC 20001-3743  
(202) 942-5000  
John.Freedman@arnoldporter.com

*\* Not admitted in the District of Columbia;  
practice limited per D.C. App. R. 49(c)(3).*

Perry M. Grossman  
New York Civil Liberties Union Foundation  
125 Broad St.  
New York, NY 10004  
(212) 607-3300 601  
pgrossman@nyclu.org

ARNOLD & PORTER KAYE SCHOLER LLP  
AMERICAN CIVIL LIBERTIES UNION

Attorneys for the *NYIC* Plaintiffs

BARBARA D. UNDERWOOD  
*Attorney General of the State of New York*

By: /s/ Matthew Colangelo  
Matthew Colangelo, *Executive Deputy Attorney General*  
Elena Goldstein, *Senior Trial Counsel*  
Office of the New York State Attorney General  
28 Liberty Street  
New York, NY 10005  
Phone: (212) 416-6057  
matthew.colangelo@ag.ny.gov

Attorneys for the *State of New York* Plaintiffs

IN THE UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF NEW YORK

NEW YORK IMMIGRATION  
COALITION, *et. al*,

Plaintiff,

v.

UNITED STATES DEPARTMENT OF  
COMMERCE, *et. al*,

Defendant.

Civil Action No. 18-CV-2921-JMF

Hon. Jesse M. Furman

**DECLARATION OF DR. CHRISTOPHER WARSHAW**

**I. Qualifications**

1. I have been asked by counsel representing the plaintiffs in *New York Immigration Coalition v. U.S. Dept of Commerce* and *State of New York v. U.S. Dept of Commerce* to analyze relevant data and provide my expert opinions. More specifically, I have been asked: to forecast the populations of every state, county, and city in the United States in 2020; given the assumption that various demographic groups are likely to be undercounted due to the inclusion of a citizenship question on the Census, to estimate the proportion of the population that belongs to those groups; to estimate the proportion of the population in every state, county, and city in the United States that belongs to those demographic groups assumed to be likely to be undercounted in 2020 due to the inclusion of a citizenship question on the Census; to analyze the likely effects of an undercount caused by the citizenship question affecting those same demographic groups on the apportionment of representatives across states for the U.S. House of Representatives; and to examine the likely consequences of an undercount caused by the citizenship question affecting those demographic groups on the

distribution of people in urban and rural counties. My expert report is PX-32 and the errata to that report is PX-323.

2. I have been an Assistant Professor of Political Science at George Washington University since August 2017. Prior to that, I was an Associate Professor at the Massachusetts Institute of Technology from July 2016 - July 2017, and an Assistant Professor at MIT from July 2012 - July 2016.
3. My Ph.D. is in Political Science, from Stanford University, where my graduate training included courses in political science and statistics. I also have a J.D. from Stanford Law School.
4. My academic research focuses on public opinion based on surveys and census data, as well as the study of representation, elections, and polarization in American Politics. I have also taught courses on statistical analysis. My curriculum vitae is PX-323. All publications that I have authored and published appear in my curriculum vitae. My work is published or forthcoming in peer-reviewed journals such as: American Political Science Review, the American Journal of Political Sciences, the Journal of Politics, Political Analysis, Political Science Research and Methods, the British Journal of Political Science, Political Behavior, the Election Law Journal, Nature Energy, Public Choice and edited volumes from Cambridge University Press and Oxford University.
5. I am also on the Editorial Board of the *Journal of Politics*. I have previously provided expert reports in *League of Women Voters of Pennsylvania v. Commonwealth of Pennsylvania* and *League of Women Voters of Michigan v. Johnson*. My non-academic writing has been published in the New York Times Upshot.

6. The opinions in this declaration are my own, and do not represent the views of George Washington University.
7. I offer these opinions with a strong degree of professional certainty based on the knowledge I have amassed over my education, training and experience, and through a detailed review of the relevant academic literature.

## **II. Projecting Future Populations**

8. The first stage of my analysis is to develop baseline projections of the population of each state, county, and city in the country in 2020. These projections are critical to determining the likely effects of an undercount in the Census due to the inclusion of a citizenship question. In order to develop these estimates, I use the Census's official estimates of the population of each state, county, and city from 2000-2017. The Census does not provide public estimates of each geographic unit's populations in future years.

### **A. Data**

9. The Census Bureau's Population Estimates Program (PEP) produces estimates of the population for the United States, states, counties, cities, towns, and other geographic areas. These aggregate estimates are based on the demographic components of population change (births, deaths, and migration) at each level of geography.<sup>1</sup>
10. My population projections are based on these official population estimates for each state, county, and city for the period from 2000-2017.
11. For the state populations from 2010-2017, I used the file 'nst-est2017-01.xlsx' which I obtained from <https://www.census.gov/data/tables/2017/demo/popest/state-total.html>. For the

---

<sup>1</sup> I do not directly use the more detailed cohort-component method used by the Census for my population projections because this information is unavailable for some geographic levels, particularly for the 2000-2010 period. It is also unclear whether the additional complexities associated with this approach would yield substantial gains in predictive accuracy.

populations from 2000-2009, I used the file 'st-est00int-01.xls' from

<https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-state.html>.

12. For the county populations from 2010-2017, I used the file 'co-est2017-alldata.csv' from

<https://www.census.gov/data/tables/2017/demo/popest/counties-total.html>. For the populations from 2000-2009, I used the file 'co-est00int-tot.csv' from

<https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-counties.html>.

13. For the county populations from 2010-2017, I used the file 'co-est2017-alldata.csv' from

<https://www.census.gov/data/tables/2017/demo/popest/counties-total.html>. For the populations from 2000-2009, I used the file 'co-est00int-tot.csv' from

<https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-counties.html>.

14. For the city populations from 2010-2017, I used the data in Factfinder available from

<https://www.census.gov/data/tables/2017/demo/popest/total-cities-and-towns.html>. For the populations from 2000-2009, I used the file 'sub-est00int.csv' from

<https://www.census.gov/data/datasets/time-series/demo/popest/intercensal-2000-2010-cities-and-towns.html>.

## **B. Statistical Model for Population Projections**

15. There are a number of potential options for forecasting the likely population of a geographic unit (e.g., states) in 2020. One possible forecasting option would be to allow the forecasts to increase or decrease over time, where the amount of change over time (called the drift) is set to be the average change in the historical data. *See* Hyndman and Athanasopoulos 2018, at 48-49. Some related methods in this family of forecasting approaches are:

- a. Linear trend between 2010-2017: One possibility is to project forward based on the linear trend in the population estimates since the last Census (e.g., Election Data Services 2017). This approach assumes that each geographic unit's population follows the same linear rate of change in the future that it has followed over the past decade. This approach has the benefit of using many years of data, but it could yield biased estimates if the population trends have changed over this period. I estimate linear trends using a simple linear regression model in the software program R.
- b. Linear trend between 2014-2017: Another possibility is to project forward based on the linear trend in the population estimates over the past 4 years. This approach assumes that each geographic unit's population follows the same linear trend in the future that it has followed over this shorter time period. This approach has the benefit of being sensitive to more recent trends, but it could be noisier than estimates based on the longer time series. That is, it could be overly sensitive to short-term trends. I estimate linear trends using a simple linear regression model in R.
- c. Change between two most recent years (i.e., 2016 to 2017): A third possibility is to focus on the change between each geographic unit's populations in the two most recent years, and assume that future years will follow this recent trend. This approach has the benefit of being based on the most recent changes in populations, but it could also be overly sensitive to short-term idiosyncratic trends. I estimate these short-term trends using the software program R.

16. As Hyndman and Athanasopoulos discuss, “Sometimes one of these simple methods will be the best forecasting method available; but in many cases, these methods will serve as benchmarks rather than the method of choice. That is, any forecasting methods . . . will be compared to these simple methods to ensure that the new method is better than these simple alternatives. If not, the new method is not worth considering.” *Id.* at 50.
17. I consider one more complex approach against these benchmarks, a state space model with exponential smoothing: This approach uses an exponential smoothing model that weights levels and trends to an extent determined by the data. *See* Hyndman and Athanasopoulos. This model uses all of the available data, but it gives more weight to the most recent years. I estimate the exponential smoothing model using the ets function in the forecast package in R.<sup>2</sup>

### **C. Validation of Population Projections**

18. The accuracy of forecasting models can only be determined by considering how well a given model performs on new data that were not used when fitting the original model. *Id.* at 62. In order to choose the best model for this analysis, I evaluated each model using two benchmarks that are similar to the challenge of forecasting the 2020 populations. First, I forecasted the Census 2010 population in each state based on 2000-2007 population estimates data. Second, I forecasted the 2017 population estimates in each state based on 2007-2014 population data. For each analysis, I used the following evaluation metrics. *Id.* at 64-65.

---

<sup>2</sup> For my state-level population projections, I used the default parameters for the ets function in R, which allowed the function to choose the exponential smoothing state space model that best fit the data in each state. The best model was usually an ‘MAN’ or ‘AAN’ model. For the population projections for cities and counties, I estimated an ‘MAN’ state space model using the ets function. The details of the state space model specification, however, do not affect any of my substantive conclusions. All of the state space models yield very similar results.



- a. The mean error across states: This helps assess whether a given metric has a systematic bias in one direction or another.
- b. The mean absolute error across states: This helps assess the accuracy of the forecasts.
- c. The mean absolute proportional error across states: This metric also helps assess the accuracy of the forecasts. It has the advantage of being unit-free (i.e., the interpretation is similar in small and large states).

19. Table 1 shows the results. For the forecast of the 2010 population, the state space model performs the best, with the lowest error, the second lowest mean absolute error, and the lowest absolute proportional errors. The two linear trend models perform the worst on this forecasting exercise. For the forecast of the 2017 population, the state space model and the linear trend model using data from 2010-2017 perform the best. The state space model has slightly lower mean errors, and the two models have similar mean absolute errors and absolute proportional errors.

Table 1: Validation of State Population Projections

Model	2010			2017		
	Mean Error	Mean Abs. Error	Mean Abs. Prop. Error	Mean Error	Mean Abs Error	Mean Abs. Prop. Error
Linear model (full period)	22,800	62,860	0.013	7,827	32,003	0.007
Linear model (4 years)	27,399	82,106	0.014	33,420	59,396	0.014
Delta in last two years	20,383	50,663	0.010	140,472	142,506	0.020
State space model	5,826	51,033	0.009	-2,599	33,378	0.008

20. Overall, the state space model performs the best across the two validation exercises. It has an average absolute proportional error of only .8% and an average absolute error of only about 40,000 people in each state. As a result, I use the state space model as my main forecasting model to generate population projections. However, the results of all the analyses that follow would be substantively similar using any of these population forecasting approaches.

**D. Incorporating Uncertainty**

21. All modeled estimates have uncertainty. My analyses use bootstrap simulations to incorporate two sources of uncertainty in all my models:

- The uncertainty in the population forecasts in every geographic unit
- Where available, uncertainty in the undercount estimates for each group

**E. Baseline estimates of 2020 populations with no undercount**

22. I used the official Census population estimates to project each geographic unit's population in 2020. Table 2 shows the population projections for a selection of cities and counties involved in lawsuits regarding the citizenship question. Table 3 shows the population projections for each state.<sup>3</sup> All of the analysis of apportionment that follows fully incorporates the uncertainties in the projections discussed above. But for simplicity, the tables themselves do not show the uncertainties.

Table 2: Population Projections in Select Counties and Cities

County/City	2010 Population	2017 Population	2020 Population Projection
Phoenix, AZ	1,446,909	1,626,078	1,698,187
Los Angeles County, CA	9,818,605	10,163,507	10,256,275
Monterey County, CA	415,052	437,907	444,016
San Francisco, CA	805,193	884,363	909,143
Miami, FL	399,457	463,347	491,295
Chicago, IL	2,695,620	2,716,450	2,704,974
Price Georges County, MD	863,420	912,756	931,412
New York NY	8,174,959	8,622,698	8,645,147
Columbus, OH	788,877	879,170	925,408
Philadelphia, PA	1,526,006	1,580,863	1,598,072
Pittsburgh, PA	305,391	302,407	297,243
Central Falls, RI	19,393	19,359	19,250
Providence, RI	177,997	180,393	181,532
Cameron County, TX	406,219	423,725	429,603
El Paso County, TX	800,647	840,410	851,600
Hidalgo County, TX	774,770	860,661	892,083
Seattle, WA	608,664	724,745	780,550

<sup>3</sup> The projections shown here do not include the overseas military population, federal employees, and dependents. However, the apportionment projections in Table 5 do include these groups.

Table 3: State population projections

State	2010 Population	2017 Population	2020 Population Projection
Alabama	4,779,736	4,874,747	4,917,351
Alaska	710,231	739,795	739,473
Arizona	6,392,017	7,016,270	7,339,157
Arkansas	2,915,918	3,004,279	3,051,838
California	37,253,956	39,536,653	40,505,540
Colorado	5,029,196	5,607,154	5,823,386
Connecticut	3,574,097	3,588,184	3,589,649
Delaware	897,934	961,939	989,662
District of Columbia	601,723	693,972	722,881
Florida	18,801,310	20,984,400	21,967,862
Georgia	9,687,653	10,429,379	10,776,655
Hawaii	1,360,301	1,427,538	1,429,641
Idaho	1,567,582	1,716,943	1,827,695
Illinois	12,830,632	12,802,023	12,701,647
Indiana	6,483,802	6,666,818	6,761,903
Iowa	3,046,355	3,145,711	3,182,994
Kansas	2,853,118	2,913,123	2,925,781
Kentucky	4,339,367	4,454,189	4,508,391
Louisiana	4,533,372	4,684,333	4,684,247
Maine	1,328,361	1,335,907	1,349,155
Maryland	5,773,552	6,052,177	6,187,649
Massachusetts	6,547,629	6,859,819	6,966,760
Michigan	9,883,640	9,962,311	9,962,308
Minnesota	5,303,925	5,576,606	5,690,791
Mississippi	2,967,297	2,984,100	2,984,630
Missouri	5,988,927	6,113,532	6,180,600
Montana	989,415	1,050,493	1,079,083
Nebraska	1,826,341	1,920,076	1,957,570
Nevada	2,700,551	2,998,039	3,174,453
New Hampshire	1,316,470	1,342,795	1,366,068
New Jersey	8,791,894	9,005,644	9,106,936
New Mexico	2,059,179	2,088,070	2,095,989
New York	19,378,102	19,849,399	19,885,662
North Carolina	9,535,483	10,273,419	10,623,613
North Dakota	672,591	755,393	752,711
Ohio	11,536,504	11,658,609	11,713,096
Oklahoma	3,751,351	3,930,864	3,974,666
Oregon	3,831,074	4,142,776	4,269,590
Pennsylvania	12,702,379	12,805,537	12,838,064
Rhode Island	1,052,567	1,059,639	1,059,639
South Carolina	4,625,364	5,024,369	5,213,894
South Dakota	814,180	869,666	891,229
Tennessee	6,346,105	6,715,984	6,915,723
Texas	25,145,561	28,304,596	29,593,219
Utah	2,763,885	3,101,833	3,274,374
Vermont	625,741	623,657	622,506
Virginia	8,001,024	8,470,020	8,632,998
Washington	6,724,540	7,405,743	7,785,568
West Virginia	1,852,994	1,815,857	1,777,893
Wisconsin	5,686,986	5,795,483	5,858,478
Wyoming	563,626	579,315	565,592

### **III. Estimating Proportion of People Likely to be Undercounted Due to Citizenship Question**

23. I was not asked to and I did not attempt to calculate the specific undercount that the addition of the citizenship question might cause. However, I evaluated a range of potential undercounts of individuals who live in households with at least one non-citizen, Hispanics or foreign-born member to demonstrate the potential effects that the addition of the citizenship question might have. Theory indicates that the addition of a citizenship question could lead to unit non-response, which occurs when a household does not respond to the Census, thereby depressing response rates among non-citizens and immigrant communities. Indeed, the Census acknowledges that it is “a reasonable inference that a question on citizenship would lead to some decline in overall self-response because it would make the 2020 Census modestly more burdensome in the direct sense, and potentially much more burdensome in the indirect sense that it would lead to a larger decline in self-response for noncitizen households.” (Abowd 2018, Section B2, p. AR 001281)

24. In my analysis, I use this information to look at three potential undercount scenarios:

- a. First, I used a 5.8% undercount estimate based on the results of the Census Bureau’s internal study of the effect of a citizenship question on self-response rates. For these analyses, I assumed that respondents that do not self-respond would not be enumerated.
- b. Second, I was asked by legal counsel to examine a potential 10% undercount for the analysis of state-level apportionment as an outer bound for the potential effects of the citizenship question on population enumerations and apportionment. This higher number reflects the Census’s finding that the differences between citizen and noncitizen

response rates and data quality are likely to be “amplified” compared to historical levels (Abowd 2018, Section B4, p. AR 001282). The Chief Scientist at the Census has acknowledged that the 5.8% estimate of the effect of the citizenship question on self-response rates is “a conservative estimate of the differential impact of the citizenship question on the self-response rates of noncitizens compared to citizens” (Abowd, J. Dep., Aug. 15, 2018, p. 202).

- c. Third, I was asked by legal counsel to examine a potential 2% undercount as a lower bound for the potential effects of the citizenship question on population enumerations. My report shows the results for cities and counties, and the calculations for a 2% undercount in states are PX-324. I was not asked to and I did not do any analysis of the impact of the Census Bureau’s Non-Response Follow-Up (“NRFU”) on non-response rates, but note that the 2% scenario could be viewed as taking into account some NRFU success after an initial larger nonresponse rate.

25. The recent Census Bureau studies discussed above focus largely on the effects of a citizenship question on self-response rates in non-citizen households. As a result, the first set of analyses I conducted for each of these undercount scenarios focuses on *people in households with a non-citizen* in them. Beyond the effects on non-citizen households, there are also strong theoretical reasons to believe that *citizen Hispanics* would also be less likely to respond to the Census if a citizenship question is included. Citizen Hispanics in immigrant communities could fear deportation due to their Census responses.<sup>4</sup> Moreover, a large

---

<sup>4</sup> Title 13, U.S.C. prohibits the use of Census data for enforcement purposes, but respondents may still have this concern (Brown et al. [2018](#)).

fraction of citizen Hispanics are likely to know non-citizens or even people that have been deported. The Census's internal analysis has shown that citizenship-related questions are likely to be more sensitive for Hispanics (Brown et al. 2018, p. 10). Indeed, the Census has found clear evidence there are likely to be differential impacts on self-response rates among Hispanics from the addition of a citizenship question. Hispanics have a greater breakoff rate (i.e., item non-response) on the citizenship question on the American Community Survey (ACS) than other demographic groups.<sup>5</sup> There is also evidence of growing unit nonresponse rates among Hispanics on the ACS (Brown et al. 2018, p. 12). For these reasons, I analyzed the effect of all three undercount scenarios (2%, 5.8% and 10%) on *both people in non-citizen households and citizen Hispanics*.

#### **A. Undercount Estimate Based on Original Survey Experiment**

26. An empirical approach to determine the potential undercount caused by a citizenship question is through a randomized control trial (RCT). The Census Bureau suggests that an appropriate RCT could compare self-response rates between households “randomly chosen to have [ ] a citizenship question (the treated group), and a randomly chosen set of control households [that] receive a [ ] Census questionnaire without citizenship” (Brown et al. 2018, p. 39)
27. We were unable to conduct a real-world RCT. A similar approach, however, is to conduct an experiment that mimics an RCT on a nationally representative survey of Americans. As part of this case, the State of New York and other plaintiffs funded a nationally representative survey that included an experiment along these lines to examine whether the inclusion of a

---

<sup>5</sup> See Abowd (2018, Section b3) and Brown et al. (2018, 7).

citizenship question would reduce the likelihood that people would complete the Census.<sup>6</sup>

This survey was designed by Dr. Matt Barreto and conducted by Pacific Market Research.<sup>7</sup>

### **1. Design of Survey**

28. This survey included a probability sample of 6,309 people, including over-samples of Hispanics, Californians, and people in several cities and counties (San Jose, CA, Cameron County, TX, and Hidalgo County, TX).<sup>8</sup> It was conducted via phone by Pacific Research Group to both landlines and cell phones using live interviews and random digit dialing. The survey asked a number of questions about the Census and assessed reactions to the inclusion of a citizenship question. The survey did not include a question about the citizenship of respondents. But it did include a question about whether respondents were born in the United States or a foreign country.
29. In my analysis, I focus on an experiment embedded in the survey that mimics the RCT approach suggested by Brown et al. (2018). This enables us to estimate the causal effect of the citizenship question on the likelihood that various demographic subgroups will complete the Census.
30. In the experiment on our survey, the control group received a vignette stating that the government had decided not to include a citizenship question on the census, while the treatment group received a vignette stating that the government had decided to include a citizenship question on the census. Then the survey asked whether respondents would ‘participate and fill out the 2020 Census form, or not?’

---

<sup>6</sup> As part of my work as an expert in this matter, I reviewed Professor Barreto’s expert report that describes the survey methodology and his analysis of the results. However, I ran all of the analyses of the survey used in this report myself. I did not directly use any of Professor Barreto’s findings for my report.

<sup>7</sup> Data and statistical code to replicate my analysis of this survey is available in my replication materials.

<sup>8</sup> The survey includes sampling weights that incorporate these over-samples and make the results representative at the national-level.

Control Group: Now that you've heard a little bit about the 2020 Census let me ask you one final question about how likely you are to participate. If the government decides in 2020 to NOT include a question about citizenship status, and instead only asks you to report the race, ethnic background, gender of people living in your household, and the government provides assurances that your information will be kept confidential and ONLY used for purposes of counting the total population and nothing more, would you participate and fill out the 2020 Census form, or not?

Treatment Group: Now that you've heard a little bit about the 2020 Census let me ask you one final question about how likely you are to participate. If the government decides in 2020 to include a question about citizenship status, and asks you to report the race, ethnic background, gender and citizenship status of people living in your household, and the government provides assurances that your information will be kept confidential and ONLY used for purposes of counting the total population and nothing more, would you participate and fill out the 2020 Census form, or not?

31. This experimental design is a strong one for assessing the causal effect of the citizenship question on the likelihood that people will complete the Census. However, it does have limitations. First, the experiment on the survey imperfectly captures the actual experience of completing the Census. Second, many respondents are probably already aware of the potential inclusion of the citizenship question on the Census, which could lead to Stable Unit Treatment Value Assumption (SUTVA) violations. These SUTVA violations could attenuate the effects we detect in the experiment by artificially reducing the differences between the treatment and control groups. Overall, I think these limitations mean the survey-based



analysis is conservative in its estimates of the citizenship question on self-response rates on the Census.

## **2. Results of Survey**

32. My primary analyses focus on two immigrant communities that theory indicates are particularly likely to be impacted by the citizenship question. First, I analyze the impact on Latinos.<sup>9</sup> This analysis is helpful because there is little publicly available Census analysis of the potential effects of the citizenship question on this group. Second, I analyze the impact on non-Latino people that are not born in the United States.<sup>10</sup>
33. I ran three sets of analyses that are shown in Table 4. My primary analysis of the effect of the citizenship question on each group is a weighted regression that evaluates the treatment effect of the citizenship question. In other words, it evaluates whether people in the treatment group, that were told the Census would include a citizenship question, are less likely to indicate they would respond to the Census than people in the control group that were told it would not include a citizenship question.
34. As robustness checks, I also ran two additional models. The middle column of Table 4 for each group is a weighted regression model that includes control variables for other factors that might affect respondents' willingness to complete the Census, including their age, race, and state of residence. The third column of Table 4 for each group is an unweighted regression model that includes this same set of control variables for other factors that might affect respondents' willingness to complete the Census. All of my main analyses in the results below are based on linear probability models. However, logistic regression models yield similar results.

---

<sup>9</sup> Note that I use the terms Hispanic and Latino interchangeably throughout this declaration.

<sup>10</sup> I include in this group both people that explicitly stated they were born in a foreign country and the small number of people that refused to answer the nativity question on the survey.

35. Overall, Table 4 shows that the citizenship question makes both Latinos and Foreign-born non-Latinos less likely to respond to the Census. The weighted regression model in column (1) indicates that Latinos are about 5.9% less likely to complete the Census if it includes a citizenship question. The results are similar in the other two models shown in columns (2) and (3). For foreign-born, non-Latinos, the weighted regression in column (4) indicates that they are about 11.3% less likely to complete the Census if it includes a citizenship question. The results are substantively similar, though more statistically significant, in the other two models shown in columns (5) and (6).

Table 4: Experiment Results on Effects of Citizenship Question on Census Response among Latinos and Foreign-born

	Latinos			Foreign-born (not Latino)		
	(1)	(2)	(3)	(4)	(5)	(6)
Citizenship Question	-0.059** (0.029)	-0.070** (0.028)	-0.062*** (0.016)	-0.113 (0.072)	-0.164** (0.066)	-0.096** (0.039)
Survey Weights	X	X		X	X	
Controls		X	X		X	X
Observations	2,362	2,362	2,362	488	488	488
R <sup>2</sup>			0.043			0.117
Adjusted R <sup>2</sup>			0.021			0.022
Log Likelihood	-2,851.497	-2,763.581		-782.779	-714.807	

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

#### IV. Baseline Estimates of Proportion of Population in Immigrant Communities Vulnerable to Undercount

36. In order to analyze the effects of an undercount of individuals that live in households with at least one non-citizen and Hispanic on total population enumerations, I used the American Community Survey (ACS) to generate baseline estimates of the proportion of the 2020 population in each state, county, and large city in the following groups that are vulnerable to an undercount:

- Non-citizen households (based on whether any member of a household in the ACS self-reports that they are a noncitizen)<sup>11</sup>
- All Hispanics and citizen Hispanics
- Foreign-born, non-Hispanics

37. To forecast the population margins of each group within each state (e.g., percent Hispanic), I used the individual-level data in the American Community Survey (ACS) from 2007-2016 to forecast the 2020 population distributions using the same approach that I used to forecast state populations. Individual-level data in the ACS is not readily available below the state-level (e.g., for counties and cities). As a result, I used population tables published by the Census based on the five-year ACS samples (2012-2016) to estimate the demographic distributions within counties and cities.<sup>12</sup> I did not attempt to estimate how these substate population distributions are likely to change between 2016 and 2020. Thus, my estimates of the percentage of county and city population that are members of immigrant communities are probably low due to the general growth of these populations.

**A. State-level Effects of Undercount - Effect of Undercount on State Population Enumerations**

38. I analyzed the effects of each undercount scenario on the enumerated population of each state in 2020. The results are shown in Table 5. Column (1) shows the baseline apportionment population projections for each state. Column (2) shows the average change in the enumerated population if 5.8% of people in non-citizen households are not counted due to

---

<sup>11</sup> It is important to note that the Census has found that the ACS might be drastically undercounting the number of households with noncitizens. The ACS implies that about 10% of people live in households with a noncitizen in them. However, Census Bureau found that many people may be misreporting their citizenship status on the ACS. Based on administrative records, they estimate that 28.6 percent of all households could potentially contain at least one noncitizen. So my estimate of the percentage of people that reside in households with a noncitizen based on the ACS is likely conservative.

<sup>12</sup> For the selection of cities and counties in Tables 2, 7, and 8, I converted the number of *non-citizens* to the number of *people in households with a non-citizen* using the ratio of these groups in the individual-level 5-year ACS sample (2012-16) for people in the PUMAs that overlapped each city and county. This analysis is necessarily approximate since PUMAs in the ACS micro-data contain multiple cities and counties.

the citizenship question. Column (3) shows the average change in the enumerated population if 5.8% of non-citizen households and Hispanics are not counted due to the citizenship question. Column (4) shows the average change in the enumerated population if 10% of people in non-citizen households are not counted due to the citizenship question. Column (5) shows the average change in the enumerated population if 10% of non-citizen households and Hispanics are not counted due to the citizenship question. Column (6) shows the average change in the enumerated population in each state based on the results of the survey experiment. Specifically, this scenario assumes that 5.9% of Hispanics and 11.3% of foreign-born, non-Latinos are not counted in the enumerated population.

39. For the analysis of apportionment, I also incorporated estimates of the overseas military population and federal employees, and their dependents living with them. Specifically, I used the 2010 population figures for the overseas military population and federal employees, and their dependents living with them, for each state, and divided this number by half to approximately reflect the reduction in the nation's military deployments over the past decade. *See* <https://www.census.gov/data/tables/2010/dec/2010-apportionment-data.html>, for 2010 population figures. *See also* Pew Foundation study, <http://www.pewresearch.org/fact-tank/2017/08/22/u-s-active-duty-military-presence-overseas-is-at-its-smallest-in-decades/>, for more information on the reduction in the number of overseas military personnel over the past decade.

Table 5: Effect of Undercount on State Population Enumerations in 2020

State	Baseline Apportionment Pop. Projection	5.8% Undercount		10% Undercount		Survey Experiment Foreign-born + Hispanics
		Noncitizens	Noncitizens+ Hispanic	Noncitizens	Noncitizens + Hispanic	
	(1)	(2)	(3)	(4)	(5)	(6)
Alabama	4,928,974	-0.3%	-0.4%	-0.5%	-0.7%	-0.6%
Alaska	745,119	-0.5%	-0.8%	-0.8%	-1.4%	-1.4%
Arizona	7,349,498	-0.9%	-2.1%	-1.5%	-3.6%	-2.6%
Arkansas	3,056,993	-0.4%	-0.6%	-0.7%	-1%	-0.8%
California	40,549,557	-1.7%	-2.9%	-2.9%	-5%	-4.1%
Colorado	5,831,253	-0.7%	-1.5%	-1.2%	-2.7%	-2%
Connecticut	3,593,415	-0.8%	-1.5%	-1.3%	-2.6%	-2.4%
Delaware	991,133	-0.6%	-1%	-1%	-1.7%	-1.5%
Florida	22,017,594	-1%	-2%	-1.7%	-3.4%	-2.7%
Georgia	10,796,611	-0.7%	-0.9%	-1.2%	-1.6%	-1.5%
Hawaii	1,432,921	-1%	-1.6%	-1.7%	-2.8%	-3%
Idaho	1,830,654	-0.4%	-0.9%	-0.8%	-1.6%	-1.2%
Illinois	12,718,521	-0.8%	-1.4%	-1.4%	-2.4%	-2.1%
Indiana	6,770,793	-0.4%	-0.6%	-0.7%	-1.1%	-0.9%
Iowa	3,186,710	-0.4%	-0.6%	-0.7%	-1%	-0.9%
Kansas	2,931,128	-0.6%	-1%	-1%	-1.7%	-1.3%
Kentucky	4,514,011	-0.3%	-0.4%	-0.5%	-0.7%	-0.6%
Louisiana	4,694,542	-0.3%	-0.5%	-0.5%	-0.8%	-0.6%
Maine	1,351,512	-0.2%	-0.3%	-0.3%	-0.5%	-0.6%
Maryland	6,195,838	-0.9%	-1.2%	-1.6%	-2%	-2.1%
Massachusetts	6,972,768	-0.9%	-1.4%	-1.5%	-2.4%	-2.4%
Michigan	9,976,301	-0.4%	-0.6%	-0.6%	-1%	-1.1%
Minnesota	5,696,268	-0.5%	-0.6%	-0.8%	-1.1%	-1.2%
Mississippi	2,990,101	-0.2%	-0.3%	-0.3%	-0.5%	-0.4%
Missouri	6,191,875	-0.2%	-0.4%	-0.4%	-0.7%	-0.7%
Montana	1,081,584	-0.1%	-0.3%	-0.2%	-0.6%	-0.5%
Nebraska	1,960,312	-0.5%	-0.9%	-0.9%	-1.5%	-1.2%
Nevada	3,178,894	-1.3%	-2.1%	-2.2%	-3.6%	-3%
New Hampshire	1,368,556	-0.3%	-0.5%	-0.5%	-0.8%	-0.9%
New Jersey	9,114,740	-1.2%	-1.9%	-2%	-3.3%	-3%
New Mexico	2,100,036	-0.8%	-3.1%	-1.3%	-5.3%	-3.3%
New York	19,907,138	-1.2%	-1.9%	-2.1%	-3.2%	-3.1%
North Carolina	10,638,762	-0.6%	-0.8%	-1%	-1.4%	-1.2%
North Dakota	754,368	-0.2%	-0.4%	-0.4%	-0.7%	-0.7%
Ohio	11,729,092	-0.2%	-0.4%	-0.4%	-0.7%	-0.7%
Oklahoma	3,981,432	-0.5%	-0.8%	-0.8%	-1.4%	-1.1%
Oregon	4,278,356	-0.7%	-1.1%	-1.1%	-1.9%	-1.6%
Pennsylvania	12,854,327	-0.4%	-0.7%	-0.6%	-1.3%	-1.2%
Rhode Island	1,060,979	-0.7%	-1.3%	-1.2%	-2.3%	-2%
South Carolina	5,224,199	-0.3%	-0.5%	-0.6%	-0.9%	-0.8%
South Dakota	894,019	-0.3%	-0.4%	-0.5%	-0.8%	-0.7%
Tennessee	6,930,386	-0.4%	-0.5%	-0.6%	-0.9%	-0.8%
Texas	29,654,648	-1.3%	-2.7%	-2.2%	-4.6%	-3.2%
Utah	3,277,814	-0.6%	-1.1%	-1.1%	-1.9%	-1.4%
Vermont	624,804	-0.2%	-0.3%	-0.3%	-0.5%	-0.7%
Virginia	8,651,354	-0.7%	-1%	-1.2%	-1.7%	-1.8%
Washington	7,799,983	-0.9%	-1.3%	-1.5%	-2.2%	-2.2%
West Virginia	1,781,304	-0.1%	-0.2%	-0.2%	-0.3%	-0.3%
Wisconsin	5,864,100	-0.3%	-0.6%	-0.6%	-1.1%	-0.9%
Wyoming	567,929	-0.3%	-0.8%	-0.5%	-1.3%	-1%

40. Overall, Table 5 indicates that each state would be affected by an undercount on the Census.

The largest impacts would be in states with large numbers of Hispanics, non-Citizens, and foreign-born residents. For example, California would be undercounted by 1.7-5.0% in these scenarios; Florida would be undercounted by 1-3.4%; New Jersey would be undercounted by

1.2-3.3%, New York would be undercounted by 1.2-3.2%; and Texas would be undercounted by 1.3-4.6%.

41. Figure 1 shows a map of the results from the survey experiment (column 6 in Table 5). This map graphically shows that heavily Latino states on the southern border have the largest impacts from an undercount. States in the northeast, such as New York, New Jersey, and Massachusetts, with significant foreign-born populations also have significant impacts.

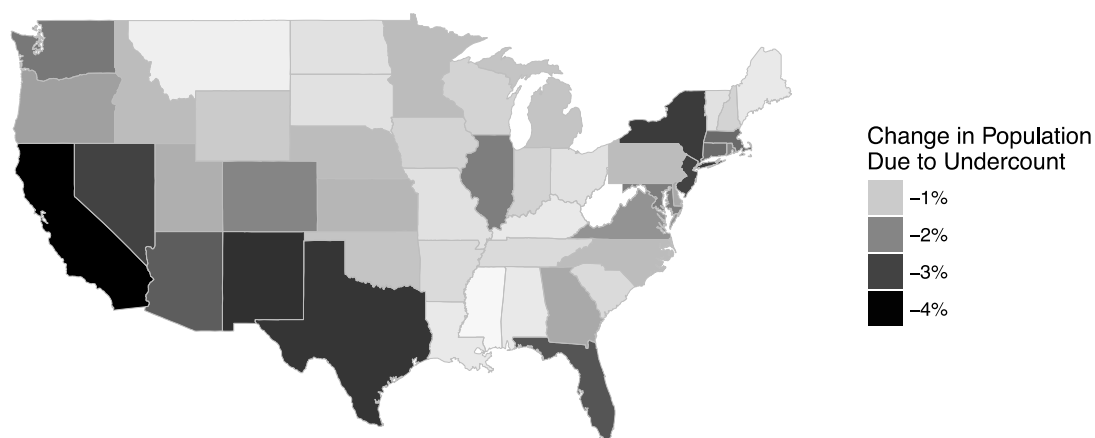


Figure 1: Effects on State Populations

42. I used the population projections and estimated effects of the various undercount scenarios on the enumerated population of each state to examine the likely effect of the citizenship question on the apportionment of seats in the House of Representatives. Article 1, Section 2, of the United States Constitution states: “Representatives and direct Taxes shall be apportioned among the several States which may be included within this Union, according to their respective Numbers.”

43. Since the first census in 1790, five methods of apportionment have been used. The government currently uses a method called the Method of Equal Proportions, which was

adopted by Congress in 1941 following the census of 1940. This method first assigns each state one seat. Then, additional seats in the House of Representatives are signed to a “priority” value. The priority value for each seat is determined by multiplying the population of a state by a “multiplier.” The multiplier is  $1/\sqrt{n(n-1)}$ . So the formula for calculating the multiplier for the second seat is  $1/\sqrt{2(2-1)}$  or 0.70710678, the formula for calculating the multiplier for the third seat is  $1/\sqrt{3(3-1)}$  or 0.40824829, and so on. The Census provides an official table of these multipliers, which I used for my calculations.<sup>13</sup>

44. The next step is to multiply the multipliers by the population total for each of the 50 states (the District of Columbia is not included in these calculations). The resulting numbers are the priority values. Multipliers and priority values must be calculated for the largest number of seats that could be assigned to a state. In my analysis, I calculated the priority values for each state for seats 2 through 60. The next step is to rank and number the resulting priority values starting with seat 51 until all 435 seats have been assigned. The final step is to tally the number of seats for each state to arrive at the total number of seats in the House of Representatives apportioned to each state.
45. I conducted these steps for 500 simulations of the population projections and undercount scenarios in each state. Table 6 shows the results. Column (1) shows the baseline projections for the number of seats that each state is likely to receive in 2020 if there is a full population enumeration. Column (2) shows the average change in the number of congressional seats if 5.8% of people in non-citizen households are not counted due to the citizenship question. Column (3) shows the average change in seats if 5.8% of non-citizen households and Hispanics are not counted due to the citizenship question. Column (4) shows the average

---

<sup>13</sup> See <https://www.census.gov/population/apportionment/about/computing.html>.

change in seats if 10% of people in non-citizen households are not counted due to the citizenship question. Column (5) shows the average change if 10% of non-citizen households and Hispanics are not counted due to the citizenship question. Column (6) shows the average change in seats in each state based on the results of the survey experiment. Specifically, this scenario assumes that 5.9% of Hispanics and 11.3% of foreign-born, non-Latinos are not counted in the enumerated populations. Also, each column includes 95% confidence intervals for the seat projections in parentheses. This means that there is a 95% chance that the true number of seats gained or lost in each scenario will be in this range.

46. First, we can examine Columns (2) and (3) of Table 6, which show the effects of a 5.8% undercount of people in non-citizens households and Hispanics. In these scenarios, California is extremely likely to lose a seat. Additionally, if there is an undercount of 5.8% of both people in non-citizen households and Hispanics, there is more than a 51% chance that Texas will lose a seat. There is also a risk that Arizona, Florida, Illinois, and New York could lose seats in some simulations.

47. Columns (4) and (5) of Table 6 show the effects of a 10% undercount of non-citizen households and Hispanics. If only people in non-citizen households are undercounted, California and Texas would be more likely than not to lose a seat. Arizona, Florida, Illinois, and New York would also be at risk of losing seats. If both non-citizens and Hispanics are undercounted, Arizona, California, Florida, and Texas would be likely to lose seats. Illinois and New York would also be at risk of losing a seat.



Table 6: Effect of Undercount on Congressional Apportionment

State	Baseline Seats	5.8% Undercount		10% Undercount		Survey Experiment
		Noncitizens	Noncitizens+ Hispanic	Noncitizens	Noncitizens + Hispanic	Foreign-born + Hispanics
Alabama	6	0 (0,1)	1 (0,1)	1 (0,1)	1 (0,1)	1 (0,1)
Alaska	1	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Arizona	10	0 (-1,0)	0 (-1,0)	0 (-1,0)	-1 (-1,0)	0 (-1,0)
Arkansas	4	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
California	53	-1 (-1,0)	-1 (-1,0)	-1 (-1,0)	-1 (-2,-1)	-1 (-2,0)
Colorado	8	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Connecticut	5	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Delaware	1	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Florida	29	0 (-1,0)	0 (-1,0)	0 (-1,0)	-1 (-1,0)	-1 (-1,0)
Georgia	14	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,1)	0 (0,0)
Hawaii	2	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Idaho	2	0 (0,0)	0 (0,0)	0 (0,1)	0 (0,1)	0 (0,1)
Illinois	17	0 (-1,0)	0 (0,1)	0 (-1,1)	0 (-1,0)	0 (-1,0)
Indiana	9	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Iowa	4	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Kansas	4	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Kentucky	6	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Louisiana	6	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,1)	0 (0,0)
Maine	2	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Maryland	8	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Massachusetts	9	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Michigan	13	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Minnesota	7	0 (0,1)	0 (0,1)	0 (0,1)	1 (0,1)	1 (0,1)
Mississippi	4	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Missouri	8	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Montana	1	1 (0,1)	1 (0,1)	1 (0,1)	1 (0,1)	1 (0,1)
Nebraska	3	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Nevada	4	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
New Hampshire	2	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
New Jersey	12	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
New Mexico	3	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
New York	26	0 (-1,0)	0 (0,0)	0 (-1,0)	0 (-1,0)	0 (-1,0)
North Carolina	14	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
North Dakota	1	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Ohio	15	0 (0,0)	0 (0,1)	0 (0,1)	1 (0,1)	0 (0,1)
Oklahoma	5	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Oregon	6	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Pennsylvania	17	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Rhode Island	1	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
South Carolina	7	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
South Dakota	1	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Tennessee	9	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Texas	39	0 (-1,0)	-1 (-1,0)	-1 (-1,0)	-1 (-1,0)	-1 (-1,0)
Utah	4	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Vermont	1	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Virginia	11	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Washington	10	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
West Virginia	2	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Wisconsin	8	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Wyoming	1	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)

48. Column (6) shows the effects of the undercount of Hispanics and foreign-born residents

found in the survey experiment. In this scenario, California, Florida, and Texas would most

likely all lose seats. Arizona, Illinois, and New York could lose a seat as well.

49. The states that lose seats in Congress would likely see decreases in their share of outlays of federal funding due to their reduction in voting power in Congress. *See* Elis, Malhotra, and Meredith 2009 (PX-325). The Elis article attached here is just an example. It is a well-established finding in political science and political economy that the loss of political power as a result of the loss of representation leads to the loss of funding. This finding is based on a body of research showing that counties in areas of states that were underrepresented in state legislatures or Congress due to malapportionment received substantially lower shares of distributive spending. In the wake of the *Baker v. Carr* family of Supreme Court cases that required one-person, one-vote, counties that were underrepresented due to malapportionment saw both their representation in legislatures and their share of spending increase substantially when the equal populace district requirement was implemented. *See* Ansolabehere, Gerber, and Snyder 2002 (PX-326). Additionally, it is also based on another body of research comparing states that barely gain or lose Representatives in Congress. *See* PX-325. The census thresholds sometimes are quite close where a state could gain or lose seats. So this research compares those states that are just above and below the population thresholds to gain or lose a seat, and it has found that the states that just barely gain a seat receive more money than the states that barely lose a seat.

#### **B. City and County Effects of Undercount**

50. I also examined the effects of the various undercount scenarios for cities and counties.

Irrespective of state-level impacts on apportionment, the enumeration of subnational areas is crucially important for a number of purposes. It affects the distribution of federal and state funds that are tied to population formulas. In addition, it affects the allocation of legislative seats within states since legislative districts are required to be equipopulous.

51. This allocation of voting power within states, in turn, affects distributive spending programs influenced by the legislature. *See* PX-326. Areas with greater population enumerations, and thus more voting power, are likely to receive more funding. This article is just another example of this well-established finding in political science. There is a large body of political science research concluding that vote dilution due to malapportionment leads to a reduction in voting power and less distributive spending.
52. It is reasonable to assume that undercounts like those addressed in my report will more likely than not impact intrastate redistricting because there is no reason to think that a state legislature would correct an undercount on the Census. I think it's a reasonable assumption that state governments would not consciously try to remedy an undercount.
53. Table 7 shows the impact on the counties and cities that are involved in the lawsuits regarding the citizenship question. The left column shows the baseline 2020 population projection. It also shows the absolute change in population and percentage change in the geographic unit's population due to three undercount scenarios. First, I examine a 2% undercount scenario. Second, I examine a 5.8% undercount scenario. For each of these scenarios, I examine undercounts among people in non-citizen households and among non-citizens households + Hispanics. Finally, I examine a scenario based on the results of the survey experiment.
54. Table 7 shows the effects on a selection of cities and counties involved in the lawsuits regarding the citizenship question. All of these local governments would most likely face smaller population enumerations due to an undercount from the addition of a citizenship question. Some of the largest effects would be in Miami, FL, New York, NY, Central Falls,

RI, and Providence RI. In the survey experiment scenario (right-hand column), each of these cities could see a reduction of around 4% or more in their enumerated populations.

Table 7: Effect on Population Counts in Select Counties and Cities

		2% Undercount				5.8% Undercount				Survey Experiment			
		Noncitizens		Noncitizens+ Hispanics		Noncitizens		Noncitizens+ Hispanics		Foreign-born+ Hispanics			
County	2020 Population	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change	Abs. Change	% Change
Phoenix, AZ	1,698,187	9,532	-0.6%	15,939	-0.9%	27,644	-1.6%	46,223	-2.7%	53,388	-3.1%	53,388	-3.1%
Los Angeles County, CA	10,256,275	74,027	-0.7%	118,962	-1.2%	214,679	-2.1%	344,988	-3.4%	469,163	-4.6%	469,163	-4.6%
Monterey County, CA	444,016	3,841	-0.9%	5,525	-1.2%	11,139	-2.5%	16,022	-3.6%	18,215	-4.1%	18,215	-4.1%
San Francisco, CA	909,143	4,640	-0.5%	6,141	-0.7%	13,457	-1.5%	17,808	-2%	37,509	-4.1%	37,509	-4.1%
San Jose, CA	1,045,953	6,843	-0.7%	10,743	-1%	19,845	-1.9%	31,153	-3%	52,766	-5%	52,766	-5%
Washington, DC	722,881	1,997	-0.3%	2,690	-0.4%	5,792	-0.8%	7,800	-1.1%	11,859	-1.6%	11,859	-1.6%
Miami, FL	491,295	4,868	-1%	7,734	-1.6%	14,118	-2.9%	22,428	-4.6%	24,713	-5%	24,713	-5%
Chicago, IL	2,704,974	12,334	-0.5%	20,052	-0.7%	35,769	-1.3%	58,152	-2.1%	76,859	-2.8%	76,859	-2.8%
Prince Georges County, MD	931,412	4,388	-0.5%	5,054	-0.5%	12,724	-1.4%	14,658	-1.6%	21,592	-2.3%	21,592	-2.3%
New York, NY	8,645,147	55,293	-0.6%	83,728	-1%	160,350	-1.9%	242,811	-2.8%	396,647	-4.6%	396,647	-4.6%
Columbus, OH	925,408	2,375	-0.3%	2,768	-0.3%	6,886	-0.7%	8,027	-0.9%	12,889	-1.4%	12,889	-1.4%
Philadelphia, PA	1,598,072	3,944	-0.2%	7,305	-0.5%	11,438	-0.7%	21,185	-1.3%	32,116	-2%	32,116	-2%
Pittsburgh, PA	297,243	480	-0.2%	614	-0.2%	1,392	-0.5%	1,780	-0.6%	3,124	-1.1%	3,124	-1.1%
Central Falls, RI	19,250	190	-1%	313	-1.6%	550	-2.9%	908	-4.7%	920	-4.8%	920	-4.8%
Providence, RI	181,532	1,249	-0.7%	1,934	-1.1%	3,622	-2%	5,608	-3.1%	6,833	-3.8%	6,833	-3.8%
Cameron County, TX	429,603	3,535	-0.8%	7,759	-1.8%	10,253	-2.4%	22,501	-5.2%	23,272	-5.4%	23,272	-5.4%
El Paso County, TX	851,600	5,844	-0.7%	14,227	-1.7%	16,947	-2%	41,259	-4.8%	43,069	-5.1%	43,069	-5.1%
Hidalgo County, TX	892,083	8,455	-0.9%	16,540	-1.9%	24,520	-2.7%	47,965	-5.4%	49,626	-5.6%	49,626	-5.6%
Seattle, WA	780,550	2,483	-0.3%	2,987	-0.4%	7,200	-0.9%	8,661	-1.1%	17,083	-2.2%	17,083	-2.2%

55. The three Texas counties would also face particularly negative impacts. Each of these heavily

Latino counties could have a reduction in their enumerated populations of over 5%.

56. Figure 2 shows the reduction in the enumerated population for every county in the country based on the survey experiment (last column of Table 7). It shows that the largest effects are in counties on the southern border, the California coast, and in the region around New York City. The counties and cities that are plaintiffs in this suit are labeled on the graph. All of these geographic units are in the most heavily impacted areas of the country.

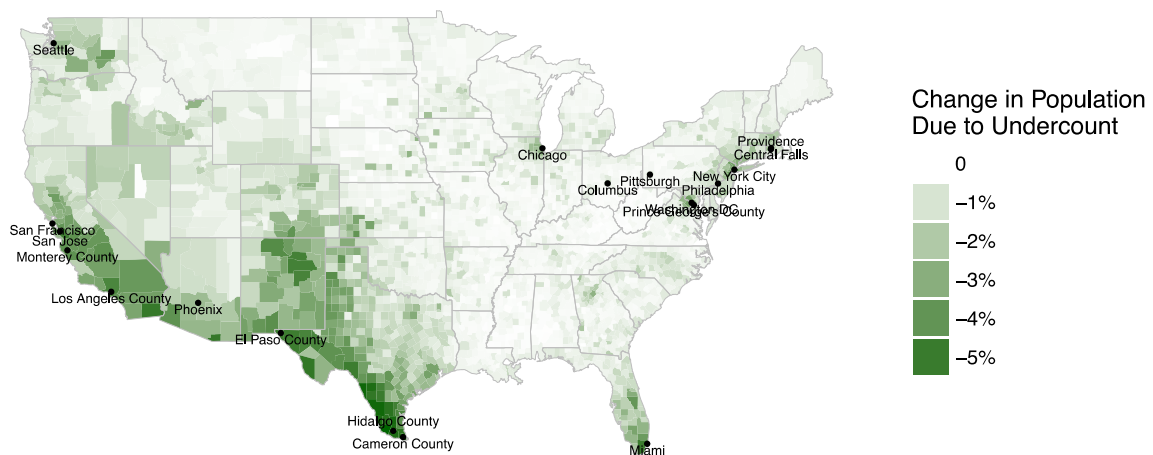


Figure 2: Effects on County Populations

57. Table 8 shows the change in each area's share of its state population due to the undercount.

This statistic is important for estimating the potential effects of the undercount on state-level formula grants, as well as on the relative voting power of each geographic area in congressional and state legislative elections. Geographic areas that see a reduction in their share of the state population are likely to get less representation in Congress and their state legislature. This reduction in voting power is likely to lead to less distributive spending. *See* PX-326. As stated before, this article is just an example. There is a large body of political science research that finds localities have their vote diluted because they are malapportioned. This implies that if the enumerated populations used for redistricting are smaller than their actual populations, then this reduction in voting power is very likely to lead to less distributive spending.

Table 8: Effect on Relative Representation in Select Counties and Cities

	2% Undercount		5.8% Undercount		Survey Experiment
	Noncitizens	Noncitizens+ Hispanics	Noncitizens	Noncitizens+ Hispanics	Foreign-born+ Hispanics
Phoenix, AZ	-0.4%	-0.4%	-0.9%	-0.8%	-0.7%
Los Angeles County, CA	-0.3%	-0.3%	-0.5%	-0.6%	-0.6%
Monterey County, CA	-0.4%	-0.4%	-1%	-0.9%	-0.1%
San Francisco, CA	0%	0.2%	0.1%	0.8%	-0.2%
San Jose, CA	-0.2%	-0.1%	-0.3%	-0.2%	-1.1%
Miami, FL	-0.9%	-1.1%	-2.1%	-2.9%	-2.6%
Chicago, IL	-0.3%	-0.4%	-0.6%	-0.9%	-0.9%
Prince Georges County, MD	-0.3%	-0.3%	-0.6%	-0.5%	-0.4%
New York, NY	-0.3%	-0.4%	-0.8%	-1.1%	-1.6%
Columbus, OH	-0.3%	-0.3%	-0.6%	-0.6%	-0.8%
Philadelphia, PA	-0.2%	-0.3%	-0.5%	-0.7%	-1%
Pittsburgh, PA	-0.2%	-0.1%	-0.2%	0%	0%
Central Falls, RI	-0.9%	-1.3%	-2.3%	-3.5%	-2.9%
Providence, RI	-0.6%	-0.7%	-1.4%	-1.9%	-1.9%
Cameron County, TX	-0.6%	-1.1%	-1.3%	-2.8%	-2.5%
El Paso County, TX	-0.5%	-1%	-0.9%	-2.4%	-2.1%
Hidalgo County, TX	-0.7%	-1.2%	-1.7%	-3%	-2.7%
Seattle, WA	-0.2%	-0.1%	-0.2%	0%	-0.2%

58. Table 8 shows the relative change in each area's population using three undercount scenarios.

First, I examine a 2% undercount scenario. Second, I examine a 5.8% undercount assumption. For each of these scenarios, I examine undercounts among people in non-citizen households and among non-citizens households + Hispanics. Finally, I examine a scenario based on the results of the survey I discussed in depth above.

59. Under nearly every scenario, each of the cities and counties would face declines in their share of their respective state populations due to an undercount from the citizenship question. Once again, some of the largest effects would be in Miami, FL, New York, NY, Central Falls, RI, Providence RI, and the three Texas counties. Each of these areas would have a reduction in their 'relative populations' (i.e., share of the state population) of several percentage points based on the survey experiment.

## **V. Aggregate Effects on Share of Population in Different Types of Counties**

60. I examined the macro effects of an undercount due to the addition of a citizenship question on the distribution of the enumerated population across urban and rural areas. For simplicity, I use the survey estimates on foreign-born people and Hispanics. But the results are broadly similar for other undercount scenarios.<sup>14</sup> The best available definition of urban and rural areas is based on a classification system developed by the National Center for Health Statistics (NCHS).<sup>15</sup> This classification system is often used to study the associations between the urbanization level of residence and health and to monitor the health of urban and rural residents. NCHS has developed a six-level urban-rural classification scheme for U.S. counties and county-equivalent entities. The most urban category consists of “central” counties of large metropolitan areas and the most rural category consists of nonmetropolitan “noncore” counties. Figure 3 shows a map of the NCHS classification scheme.

---

<sup>14</sup> For confidentiality reasons, it is not possible to match the ACS micro-data to smaller cities and counties. So, for this analysis, I calculated the ratio of people in non-citizen households to individual non-citizens for each state in the 2016 ACS. I then multiplied these ratios by the estimates of the number of non-citizens in each city and county to estimate the number of people in households with a non-citizen.

<sup>15</sup> See [https://www.cdc.gov/nchs/data\\_access/urban\\_rural.htm](https://www.cdc.gov/nchs/data_access/urban_rural.htm).

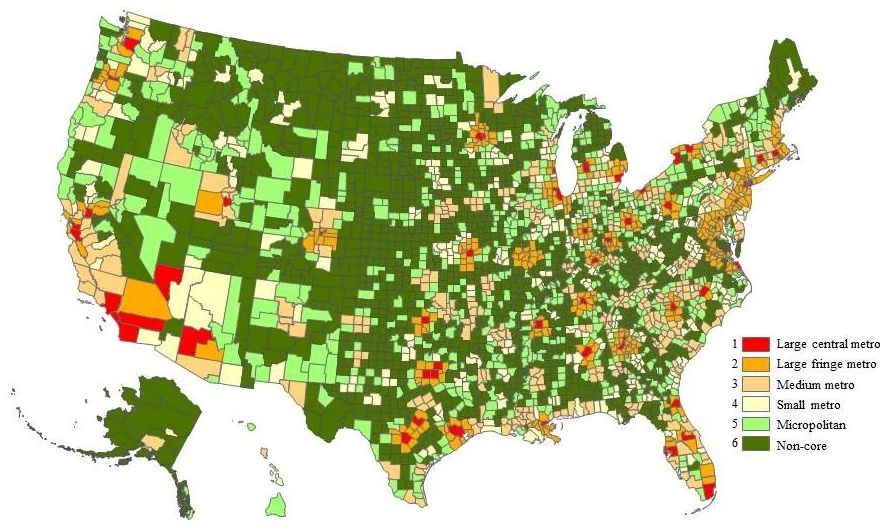


Figure 3: 2013 Urban-Rural Classification Scheme for Counties

61. Figure 3 shows that an undercount due to a citizenship question would have the most substantial impact in large metropolitan counties with major cities. Based on the survey experiment, these counties would have a reduction in their enumerated population of 2.9%.<sup>16</sup> This group of counties would also have a reduction in their share of the national population of 1.1%. This reduction in urban areas' relative population would likely lead to dilution in their voting power and a reduction in their representation in Congress and state legislatures. At the other end of the continuum, noncore rural counties would only have a reduction in their enumerated population of .5%. Moreover, they would actually see a sizable 1.4% increase in their share of the national population. This would lead to an increase in their representation in the legislature. Thus, the undercount caused by a citizenship question on the

<sup>16</sup> The patterns are broadly similar in the other scenarios.



Census would lead to a redistribution of political power in America. It would reduce the representation of urban counties, and increase the voting power of rural counties.

Table 9: Effect on Distribution of Enumerated Population Across Urban and Rural Counties

County	2020 Population Projection	Percentage Change Due to Undercount	Percentage Change in Relative Population
Large central metro	103,025,259	-2.9%	-1.1%
Large fringe metro	83,761,694	-1.8%	.1%
Median metro	69,737,033	-1.5%	.3%
Small metro	30,116,705	-1%	.9%
Micropolitan	27,375,961.605	-.8%	1.1%
Noncore	18,760,860	-.5%	1.4%

## VI. Conclusion

62. I have reached the following conclusions:

- a. The undercount caused by the inclusion of a citizenship question on the Census is likely to have effects on the population counts of each state, and the apportionment of representatives across states for the U.S House. There is a very high probability that California will lose a congressional seat, and it is more likely than not that Texas will lose a congressional seat. There is also a substantial risk that Arizona, Florida, Illinois, and New York could lose a seat.
- b. The citizenship question is also likely to have effects on the population counts of large counties and cities within each state. This will affect the distribution of voting power within states, and lead to the dilution of the voting power of New York, NY, Miami, FL, Providence, RI, and other large cities with substantial immigrant populations.

- c. Overall, the citizenship question will lead to a large-scale shift in the distribution of political power in the United States. It would dilute the voting power of urban counties, and increase the voting power of rural counties.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: October 26, 2018

Washington, DC

A handwritten signature in black ink, appearing to read "Chris Warshaw", is written over a horizontal line.

Christopher Warshaw

## Appendix

Table A1: Effect of 2% Undercount on State Population Enumerations in 2020

State	Baseline Apportionment Pop. Projection	Noncitizens	Noncitizens+ Hispanic
Alabama	4,928,974	-0.1%	-0.1%
Alaska	745,119	-0.2%	-0.3%
Arizona	7,349,498	-0.3%	-0.7%
Arkansas	3,056,993	-0.1%	-0.2%
California	40,549,557	-0.6%	-1%
Colorado	5,831,253	-0.2%	-0.5%
Connecticut	3,593,415	-0.3%	-0.5%
Delaware	991,133	-0.2%	-0.3%
Florida	22,017,594	-0.3%	-0.7%
Georgia	10,796,611	-0.2%	-0.3%
Hawaii	1,432,921	-0.3%	-0.6%
Idaho	1,830,654	-0.2%	-0.3%
Illinois	12,718,521	-0.3%	-0.5%
Indiana	6,770,793	-0.1%	-0.2%
Iowa	3,186,710	-0.1%	-0.2%
Kansas	2,931,128	-0.2%	-0.3%
Kentucky	4,514,011	-0.1%	-0.1%
Louisiana	4,694,542	-0.1%	-0.2%
Maine	1,351,512	-0.1%	-0.1%
Maryland	6,195,838	-0.3%	-0.4%
Massachusetts	6,972,768	-0.3%	-0.5%
Michigan	9,976,301	-0.1%	-0.2%
Minnesota	5,696,268	-0.2%	-0.2%
Mississippi	2,990,101	-0.1%	-0.1%
Missouri	6,191,875	-0.1%	-0.1%
Montana	1,081,584	0%	-0.1%
Nebraska	1,960,312	-0.2%	-0.3%
Nevada	3,178,894	-0.4%	-0.7%
New Hampshire	1,368,556	-0.1%	-0.2%
New Jersey	9,114,740	-0.4%	-0.7%
New Mexico	2,100,036	-0.3%	-1.1%
New York	19,907,138	-0.4%	-0.6%
North Carolina	10,638,762	-0.2%	-0.3%
North Dakota	754,368	-0.1%	-0.1%
Ohio	11,729,092	-0.1%	-0.1%
Oklahoma	3,981,432	-0.2%	-0.3%
Oregon	4,278,356	-0.2%	-0.4%
Pennsylvania	12,854,327	-0.1%	-0.3%
Rhode Island	1,060,979	-0.2%	-0.5%
South Carolina	5,224,199	-0.1%	-0.2%
South Dakota	894,019	-0.1%	-0.2%
Tennessee	6,930,386	-0.1%	-0.2%
Texas	29,654,648	-0.4%	-0.9%
Utah	3,277,814	-0.2%	-0.4%
Vermont	624,804	-0.1%	-0.1%
Virginia	8,651,354	-0.2%	-0.3%
Washington	7,799,983	-0.3%	-0.4%
West Virginia	1,781,304	0%	-0.1%
Wisconsin	5,864,100	-0.1%	-0.2%
Wyoming	567,929	-0.1%	-0.3%